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## The Empowering Role of Enterprise Information Portals in Knowledge Management

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**The Empowering Role of Enterprise Information Portals in Knowledge Management**



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**Abstract**

The increasing role of enterprise information portals (EIPs) in different applications of information, including knowledge management (KM), makes it a necessity to elaborate the issue in a more serious and scientific way. The contribution and role that these kinds of portals have in empowering KM provide a theoretical framework through which to offer a conceptual basis for present and future KM trends. So the main purpose of this article is to organize theoretical concepts discussed on EIPs in a summarized manner and provide a conceptual context for thinking and working on them. It should be noted that the perspective regarded here is more theoretical than technical. Meanwhile, technical issues are discussed as much as they are relevant to the objective of this article.

**Introduction**

Today, more than ever, business is a key shaper of the emerging global society. The exchange of knowledge, materials, energy, and people; the blending of cultures; and the dissipation of geo-political boundaries are to a great extent the result of transnational business operations. The relevance of knowledge and the need for approaches to manage it became apparent first and foremost in the business world [1]. Accessing, evaluating, managing, organizing, filtering, and distributing information in a manner that is useful to end users KM involves blending a company's internal and external information and turning it into actionable knowledge via a technology platform [2].

The Internet and its various applications have made many tasks easier than what they were in the past, including KM. For many companies and their staff nothing is important more than managing the information or knowledge they possess. The World Wide Web (WWW) has come to help these people and meet their information needs in an easy way. Usually every company has its own website on the Internet offering online information services to its members and clients. The more useful such web-based services would be, the more added values will be shifted towards users and more profits will be brought for the company in long term. So what kind of solution would be the best for such a purpose?

There have been many examined methods or solutions, but the increasing usage of EIPs has proved them as the most appropriate way of offering web-based services on a given subject to a defined class of users. EIPs' applied characteristics have reflected their empowering role in KM. So they may be regarded as useful means of knowledge management meeting most of KM objectives.

## **KM Process Position**

Let's start our discussion with determining the KM process position according to a managerial perspective then study EIPs related functions. There are three categories of business processes [3]:

- Operational Business Processes
- Knowledge Processes
- Knowledge Management Processes

Operational processes are those that use knowledge but, apart from knowledge about specific events and conditions, do not produce or integrate it.

There are two knowledge processes: knowledge production, the process an agent executes that produces new generalizing knowledge, and knowledge integration, the process that presents the new knowledge to agents comprising the producing agent.

There are nine knowledge management processes, which are listed later. For now, note that their purposes are to enhance knowledge processing, to perform KM-level knowledge processing and to integrate the knowledge management function itself.

## **Knowledge Processes**

Knowledge production is a process made up of four task clusters (or sub-processes) [3]:

- Information Acquisition
- Individual and Group Learning
- Knowledge Claim Formulation
- Knowledge Claim Evaluation

Knowledge integration is made up of four more task clusters [3], all of which may use interpersonal, electronic or both types of methods in execution:

- Knowledge and Information Broadcasting
- Searching/Retrieving
- Knowledge Sharing (peer-to-peer presentation of previously produced knowledge)

- Teaching (hierarchical presentation of previously produced knowledge)

Among the eight sub-processes above, it is important to remember that individual and group learning is itself knowledge processing. Individual and group learning produces knowledge claims for consideration at higher levels of analysis of knowledge processing. But at the individual and group levels themselves, learning is knowledge production, and depending on the group level, all four task clusters are involved at that level too. Let's call it the "nesting" of knowledge processing in the enterprise [3].

## **Knowledge Outcomes**

Knowledge processes, of course, produce outcomes. From a managerial point of view, knowledge is an encoded, tested, evaluated and still surviving structure of information that helps the adaptive system (agent) that developed it to adapt.

Two types of knowledge are important in organizations [3]:

1. Tested, evaluated and surviving beliefs or belief predispositions (in minds) about the world, and
2. Tested, evaluated and surviving, sharable (objective), linguistic formulations (knowledge claims) about the world.

There are also other outcomes of knowledge processes, the most important of which are knowledge claims about (1) and (2) . . . the track record of knowledge claim evaluation.

The various outcomes of knowledge processes may be viewed as part of an abstraction called the Distributed Organizational Knowledge Base (DOKB). The DOKB has electronic storage components, but it is more than that because it contains all of the outcomes of knowledge processing in documents and non-electronic media. And because it includes beliefs and belief predispositions as well, it also includes all of the mental knowledge in the enterprise [3].

## **How Things Work**

Operational business processes are performed by agents who use previous knowledge in the DOKB, both mental knowledge and knowledge in organizational repositories to make decisions. Sometimes the DOKB and an agent's perceived situation doesn't provide the answers it needs. A problem has arisen—an epistemic gap between what an agent knows and what it needs to know to participate in the business process. Such a problem initiates knowledge processing, specifically a new knowledge production process. Once the problem is perceived, there is a need to formulate tentative solutions.

Those can come from new individual and group learning addressing the problem, or from external sources through information acquisition, or from entirely creative knowledge claim formulation, or, of course, from all three.

Where the tentative solutions come from and in what sequence are of no importance to the self-organizing knowledge processing pattern of knowledge production. The only important thing about sequence here is that knowledge is not produced until the tentative solutions, the previously formulated knowledge claims, have been tested and evaluated in the knowledge claim evaluation sub-process. And that sub-process, Knowledge Claim Evaluation (KCE), is the way in which agents select among tentative solutions, competitive alternatives, by comparing them against each other in the context of perspectives, criteria or newly created ideas for selecting among them to arrive at the solution to the problem motivating knowledge production [3].

## **Knowledge Claim Evaluation**

KCE is at the very center of knowledge processing and knowledge management. Think about it. Without KCE, what is the difference between information and knowledge? How do we know that we are integrating (broadcasting, searching/retrieving, sharing, or teaching) knowledge rather than just information? And finally, how do we know that we are doing knowledge management and not just information management?

Once knowledge and other tested and evaluated information are produced by KCE, the process of knowledge integration of the solution begins. There is no particular sequence to the integration sub-processes listed earlier. One or all of them may be used to present what has been produced to the enterprise's agents or to store what has been produced in the various repositories in the enterprise system.

Those agents receiving knowledge or information don't receive it passively. For them, it represents an input that may create a knowledge gap and initiate a new round of knowledge production at the level of the agent receiving it. Integration of the knowledge, therefore, doesn't signal its acceptance. It only signals that the instance of knowledge processing initiated by the first problem is over and that new problems have been initiated for some by the solution. For others, the knowledge integrated is knowledge to be used - either to continue with executing the business process that initiated the problem or at a later time when the situation calls for it [3].

## **Knowledge Life Cycle**

Either way, the original problem that motivated knowledge processing is gone. It was born in the operational business process, solved in the knowledge production process, and its solution was spread throughout the organization during knowledge integration

and in that way, it ceased to be a problem—i.e., it died. That pattern is a life cycle, a birth-and-death cycle for problems arising from business processes.

The life cycle gives rise to knowledge, both mental and cultural (linguistic), and so we call it the Knowledge Life Cycle (KLC). Every organization produces its knowledge through the myriad KLCs that respond to its problems: KLCs at the organizational level and KLCs at every level of social interaction and individual functioning in the organization. It is through the KLCs that knowledge is produced, and the organization acquires the solutions it needs to adapt to its environment.

Organizations differ in the profile of their KLCs. They acquire information in different ways. They formulate solutions in different ways. They integrate them in different ways. And above all, they evaluate tentative solutions in different ways. Organizations also differ in the patterning of their knowledge outcomes. They have different procedures for doing things, different software capabilities, different sales forecasting models, and different performance monitoring schemes [3].

## **KM Processes**

Knowledge Management is the set of processes that seek to change the organization's present pattern of knowledge processing to enhance both it and its knowledge outcomes. That implies that KM doesn't directly manage knowledge outcomes, but only impacts processes, which, in turn, impact outcomes. For example, if one changes the rules affecting knowledge production, the quality of knowledge claims may improve, or if a KM intervention supplies a new search technology based on semantic analysis of knowledge bases that may result in improvement in the quality of models. There are at least nine knowledge management processes [3]:

- Symbolic Representation
- External Relationship Building with Others Practicing KM
- Leadership
- KM-level Knowledge Production
- KM-level Knowledge Integration
- Crisis Handling
- Change in Knowledge Processing Rules
- Negotiation for Resources with Representatives of Other Organizational Processes
- Resource Allocation for Knowledge Processes and for Other KM Processes

KM-level knowledge production and integration reflects the idea that KM may also be about responding to epistemic gaps arising from knowledge management operational processes themselves. The change in the knowledge processing rules process, for example, may develop epistemic problems. In that case, KLCs at the level of KM

processing will be initiated and will produce and integrate new knowledge about how to change knowledge processing rules to enhance information acquisition, knowledge claim evaluation or one of the other sub-processes of the KLC [3].

## **IT Applications and KM**

When is an IT application a knowledge processing or management application, as distinct from an information processing or management application? I think part of the answer lies in the framework presented earlier. With the framework as background, the short answer to the above question is that an IT application supports knowledge processing to the extent that its use cases support the eight sub-processes of knowledge production and integration discussed earlier. Further, it supports KM to the extent that it supports the nine knowledge management processes.

Some may think that an IT application supports KM if it performs content management, or if it supports collaboration, or if it performs data mining. But the connection between those and other types of applications and knowledge processing and KM is at best indirect, and at worst very tenuous, because each such application may or not provide support for the knowledge or KM processes. In each case of an IT application, therefore, the connection from the application in question to knowledge processing and KM use cases must be demonstrated. The connection is simply not self-evident because the application in question is a content management or a collaborative application [3].

## **Portals, Knowledge Processing and Knowledge Management**

The point we've made in connection with IT applications, in general, applies with equal force to enterprise information portals. Whether any particular portal product or solution supports knowledge processing and KM is not a question whose answer should be assumed. The answer instead should flow from careful analysis of the extent to which a product or solution supports the eight knowledge processes and/or the nine KM processes . . . and whether, in so doing, it aids knowledge management in enhancing the KLCs within an organization, and with them the organization's adaptive capability.

When a portal product provides appreciable support for KLC and KM processes, and especially when it supports the critical KCE process, it is proper to call that portal an enterprise knowledge portal (EKP). But until then, we should resist using that term and recognize that however desirable the halo effect of the name, the application involved is one that has not yet crossed the line from mere information processing and management to knowledge processing and KM [3].



## **The Advent of Portals for Knowledge Management**

How will portals support access to structured and unstructured data? Corporate users need to access relevant business data and information, whether structured or unstructured, alphanumeric or text. The problem is that structured and unstructured data have been managed separately with little or no thought to common access. Providing users access to multiple applications under the cover of an information portal also does not solve the problem. The key is providing the infrastructure to support unified access. Advances in content management, along with extensions to SQL-based queries, signal a new era of unified access to heterogeneous data. This will be the third wave of information portals in support of knowledge management [4]. Knowledge management extends traditional business intelligence in the following ways:

- Integrated Access to Structured and Unstructured Data
- People: Tracking and Analyzing How People Use Information
- Process: Delivering information to those who need it when they need it, building intelligence into a business process

Portals are positioned to become the means for supporting the information access and delivery required for knowledge management.

Corporate portals have taken the idea of consumer portals like Yahoo and Excite and adapted them for corporate intranets. Those portals partition the “real estate” of the user’s screen, running multiple applications side by side. The burden is placed on the user to sort any semantic inconsistencies between the meaning of information displayed in one part of the screen (via one application) and that on another part of the screen (via another application). From the perspective of data access:

- Unstructured data: Portals enable users to search through corporate documents, primarily via full-text searching. The documents are formatted as HTML pages for display to the user.
- Structured data: Business intelligence query/reporting tools provide the capability to build reports from structured data sources. The reports are formatted as static HTML pages and viewed through a browser-based portal.

Corporate portals begin to embed more advanced features, deepening the level of access and providing better information sharing. Examples are Viador’s bundling of Infoseek’s search engine with its reporting capabilities, or Hummingbird’s bundling its Andyne business intelligence technology with its PC DOCS technology.

Where we are headed is toward a convergence of unstructured and structured data access. One sign of the future convergence is the relationship between Brio and



Autonomy, which promises to bring Autonomy's search and classification engine (for unstructured data) to expand the scope of Brio's business intelligence software. The results should be reflected in future versions of the Brio portal [4].

Another sign is IBM's ongoing Project Garlic, aimed at providing a federated search engine that could integrate (based on unified metadata) the results of structured and unstructured queries or searches. The results of that effort should emerge in various stages within IBM's DB2 database Data Joiner and portal infrastructure software [4].

If content management engines can classify the concepts within a document, data items can be stored outside the documents as accessible fields—most likely tagged in XML. The data attributes or fields can then be joined with existing customer records to form an expanded logical, heterogeneous record—ready to be accessed via enhanced information portals.

Unified data access means that this query can be handled. Moreover, unified data access should enable the aggregation and measurement of trends over time, which is the regular province of multidimensional analysis and data mining. Those attributes are candidate dimensions for examining trends in customer behavior, supplier performance, employee turnover and the like. For example: what are the best predictors of customer churn—changes in buying patterns, changes in e-mail topics or some combination?

Additional data can be gleaned by the portal to track how people are using information, another area not exploited by business intelligence today. That will enable identification of experts for better collaboration, as well as smart information push to those who need the information when they need it—a fundamental goal of knowledge management. Hence, in addition to expanded access to information, future portals will need to incorporate better support for people and process.

The separate worlds of structured and unstructured data access are coming together. There is a prospect for gaining more intelligence about customers, suppliers and employees than could be gained by access to only one type of data. That also implies a shakeout in the vendor ecosystems that have grown up around each type of data. The result will be portals that provide wider, deeper and more collaborative business intelligence.

## **EIPs facilitate exchange among communities of interest**

Although the principles of KM are broadly accepted, how to implement a KM project is a key sticking point. An integrated database or knowledge repository is often the first step along the KM path. Because KM should be part of everything an organization does

and part of everyone's job, the easiest way to implement a KM initiative is through networking.

KM can be understood as a four-part, closed-loop process that returns a net gain of EIPs:

- Capturing knowledge: Ideas are synthesized in a memo, sales figures are reported in an e-mail and a list of corporate expenditures is placed in a relational database.
- Analyzing and cataloging knowledge: Raw data becomes information when it is placed in a meaningful context. Categorization is essential to the success of a KM solution because it provides a framework for other users to locate information. FAQs, "best-practices" documents and a corporate directory of experts are examples of codified knowledge.
- Sharing knowledge: EIPs can encourage collaboration. Workers amend and update resources as they use them. That modification leads back to the first step of enterprise learning. Users loop their learning and new information back to a database. In that way, portals are built on knowledge bases that are relevant, focused and available to everyone in the company.
- Creating knowledge: Most fundamentally, KM and information architecture are about enhancing capacities for knowledge creation.

Databases do more than provide a single point of entry for information and a single log-on. They hook people together and promote interactive problem solving. Integrated databases are important because they make the best insights of each employee available to all. That means that each worker has access to the collective wisdom of the organization. Project archives, for instance, are an excellent way to encourage virtual teamwork and dialogue. They are clearinghouses where communities of interest have access to current and past project information. A project archive functions as an electronic work space that both stores information and provides a focal point for collaboration [5].

## **EIP Software Functions & Properties**

EIPs integrate access to data, information and applications, and present it to the business user in a useful format. The portals are used by the business user, but include IT administration tools, and have some level of the following functionality native to them:

- Role-based or Rule-based Administration
- Collaboration
- Content Management and Search
- Access to structured data such as user query and reporting

Offering some level of those capabilities is a must for EIP vendors, and sometimes they partner to achieve such functionality, especially search technologies.

EIP software sits on top of existing applications, integration layers and information sources. It can then be further customized to create new Web-based applications that use information and application services available inside and outside the enterprise. An example of that would include self-service applications built using an EIP framework [6].

The broader portal software ecosystem is comprised of many other technology offerings that complement EIP software. Companies can add supporting functionality as needed or integrate access to existing applications and information sources.

Relatively few companies have metrics in place to measure the financial impact an EIP-based solution can yield. The same statement holds for e-mail, yet few companies would operate without it. When financial metrics are not abundant, general business goals that impact financial performance can be used to justify the purchase of EIP software:

- Retain Expertise of Key Personnel
- Increase Customer Satisfaction
- Improve Productivity
- Decrease IT Administration Costs
- Decrease Product Development Cycles
- Support E-business Initiatives

Companies can expect a variety of benefits from adopting EIP software and should detail their expectations when assessing their need for it and selecting appropriate vendors.

Once an overview of EIP software is understood, it is useful to understand the major categories of functionality that may be sought to achieve predefined goals. Companies considering purchasing EIP software should first consider their strategic goals, assess the availability of supporting capability currently in house, and create an RFP (Request For Proposal) detailing requirements to meet those goals. During this economic downturn, conducting an ROI (Range Operating Instruction) study prior to adoption of any software is increasingly important. The ROI models can become complex considering the amount of touch points that an EIP has within an enterprise.

As EIP software changes in scope and new entrants enter the market, new knowledge management capabilities will be incorporated into it. Features such as content visualization, contextual collaboration and expert location will aid employees in finding an answer to their business problem. Delivery of content in the context of a business

process will greatly decrease decision time. Additionally, business processes will be analyzed, modeled and quickly deployed to allow for continuous improvement without extensive application re-engineering. EIP software can provide firms with a software platform to better manage knowledge and knowledge workers, but user needs must be analyzed first.

Some of EIP software properties may be numbered as:

- Application Integration
- Structured Data Management
- Content and Document Management
- Collaboration
- Administration
- Architecture/Platform
- Security
- Services
- Support

### **An Applied Sample: ServiceWare Knowledge Portal**

Formerly “InfoImage Portal 5.0,” this product was recently acquired by ServiceWare [7]. It is claimed to be the most scalable and flexible portal platform available, allowing organizations to rapidly deploy intranet, extranet and Internet portal solutions. Knowledge Portal 5.0 includes a rich set of features for development, deployment, administration and end-user adoption of the portal.

According to a leading technology analyst firm The Delphi Group, there are several key features required for a successful portal platform: integration, categorization, search, publication and distribution, process, collaboration, personalization and presentation. Knowledge Portal delivers these functions through five technology differentiators. Based on their criteria, The Delphi Group deemed the product “a true platform.”

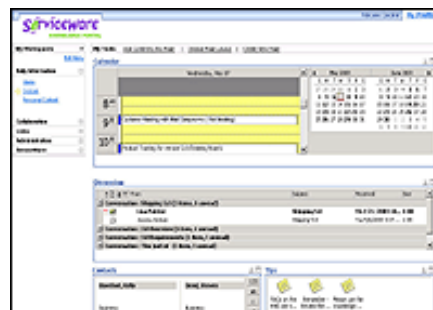


Figure1. A General View of Knowledge Portal 5.0 Platform

The ServiceWare Knowledge Portal platform enables companies or departments to provide a single unified workspace for access to applications and information. The portal can be deployed to employees, customers and business partners and can allow each group to have its own view of the information and applications important to them.

## **Conclusion**

The modern nature of e-commerce has made an environment of rapid growing change in different forms of business interactions people have today. And the turning point of this reality is laid in “knowledge” and those methods people may use as their own way of “knowledge management.” Portals in general and Enterprise Information Portals specifically have been appeared in the scope of KM as useful tools designed mainly to save energy, time and money of their users. Many of KM objectives that were met in the past through traditional ways are now being satisfied easily by EIPs. The main issue is that how these portals should be designed and how they should be used to bring the most profit for their users in KM. Nowadays many well-known companies are established to design and offer different kinds of EIPs with various capabilities. It’s natural that selecting the best one among these companies and their products is a hard task, but evaluating them through trial periods of usage may reveal may realities helping make the final choice. The major principles or criteria that should be kept in mind while selecting portal software include: Retaining expertise of key personnel, increasing customer satisfaction, improving productivity, decreasing IT administration costs, decreasing product development cycles and supporting e-business initiatives.

Anyway, the growing usage of EIPs has proved them as capable tools of KM and defined their empowering role in this regard. It should be also remembered that EIPs do not provide all the things but they are able to satisfy a reasonable range of users’ KM expectancies. Main capabilities of EIPs in empowering KM include: Integrated access to structured and unstructured data, tracking and analyzing how people use information, and delivering information to those who need it when they need it building intelligence into a business process.

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